

rearward position. Although the bolt is spring-biased towards its forward position, the bolt will typically be held in its rearward position by the sear except during firing.

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The valve assembly includes a reciprocating housing containing a stationary forward valve poppet, a sliding rear valve poppet, and a spring between the front and rear valve poppets. The spring pushes the rear valve poppet rearward, causing the rear poppet to bear against the housing, thereby closing the rear valve and pushing the housing rearward. Pushing the housing rearward causes the housing to bear against the front valve poppet, thereby closing the front valve.

On page 14, line 25:

An alternative embodiment of a magazine assembly 108 is illustrated in Figure 15. The cylinder 110 has been replaced by an elongated bar 146, having a plurality of chambers 148, indexing holes 150, and flutes 152 along its bottom surface. At least one spring-biased bearing 116 engages a flute 152 to align the chambers 148 with the barrel 14. A pair of slots 154, 156 permit the rod 146 to be inserted into the rifle 10 by accommodating the pawl 126. As will be seen below, indexing of the magazine 146 is very similar to the indexing of the cylinder 110.

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On page 15, line 6:

Referring to Figures 18-21, the buffer system 158 is illustrated. A preferred buffer system 158 includes an air piston bolt driver 160, a floating mass bolt driver 162 having a floating mass 164 therein, and a spring 166 disposed therebetween. The air piston bolt driver may preferably be made of two pieces, a forward portion 168 and rear portion 170. The buffer system 158 is located directly behind the bolt 38, and is housed within a buffer tube 172 within the shoulder stock 18. Depending on the length of the buffer tube 172, the forward portion 168 of the air resistance bolt driver may either be attached or removed from the rear portion 170 of the air piston bolt driver 160.

On page 16, line 4:

To use the rifle 10, a gas cartridge 28 is first secured to the compressed gas channel 104. At least one gas cartridge 28 must be used, and more than one may be used. If desired, a pressure gauge 30 may also be connected to the compressed gas channels 104. The gas selected may be either compressed air, or any compressed gas commonly used for air guns. One example is carbon dioxide. Next, projectiles are loaded into the magazine. If a rotary magazine or cylinder 110 is used, any projectile suitable for use in an air gun may be used, including spherical projectiles, conventional pellets, darts, etc. The cylinder 110 is loaded by first depressing the bearing 116 so that it does not block removal of the cylinder 110, and then pushing forward on the reloading tab 130, thereby retracting the pawls end 132 from the chamber. The cylinder 110 is now free to exit the rifle 10. The projectiles are pushed into place through the front portion of the chambers, and secured with friction. After loading all six chambers, the cylinder 110 may be inserted back into place within the rifle 10, after which the shooter re-engages the bearing 116 with the magazine flute 114. If a tubular magazine is used, preferred projectiles include spherical projectiles. These may be loaded by first retracting the follower 142 using a finger tab secured to the follower (not shown and well known in the art), opening the loading gate 144, and pouring spherical projectiles into the magazine tube. Releasing the follower 142 will push the first spherical projectile into the chamber 112 aligned with the tubular magazine 140.

On page 17, line 10:

Compressed air will be supplied from the compressed air container 28, through the compressed air channels 104 and hose 102 to the center portion of the valve assembly 40 between the forward valve 88 and rear valve 90. Before firing, the trigger mechanism 36, valve assembly 40 and bolt 38 are in the positions illustrated in Figure 4. The bolts 38, although biased forward by pressure from the spring 166, is held in its rear position by the rear end 80 of the sear 74 engaging the notch 82. Pressure from the spring 75 holds the sear 74 in this position, forward pressure from the bolt 38 against the sear 74 pushes the sear towards its forwardmost position on the sliding pivots 76. The trigger spring 44 holds the trigger 26 in its forwardmost position. The selector 46 may be rotated to the appropriate position, corresponding to safe, semi-automatic, or full automatic at a low or high cyclic rate. Figure 5 depicts

the location of the parts when the trigger is pulled in semi-automatic mode. Trigger 26 has been pulled rearward until the selector-engaging portion 50 engages the surface 58 of the selector 46. The trigger bar 64 moves rearward, thereby pivoting the end 68 of the sear's trip 66 upward so that the radiused surface 70 pushes the sear's forward end 78 upward, thereby pivoting the sear's back end 80 downward, releasing the bolt 38 to travel forward. During the forward travel of the bolt 38, the operating rod 118 moves from the rearward position depicted in Figures 10 and 13 to the forward position depicted in Figures 9 and 14. The pawl carrier 124 is thereby moved from its right side position of Figure 10 and 13 to its left side position of Figures 9 and 14. The pawl's end 132 is pushed out of the chamber 112 in the one o'clock position when viewed from the rear (Figures 10 and 13) to the eleven o'clock position of Figures 9 and 14, without rotating the cylinder 110. When the bolt 38 reaches its forwardmost position, air pressure between the bolt 38 and valve housing 86, enhanced by the O-rings 84 and 106, causes the valve housing 86 to move forward, thereby opening the forward valve 88. This releases compressed air to a position immediately behind the projectile in the chamber 112 aligned with the barrel 14, thereby discharging the projectile. At the same time, the bolt 38 strikes the rear valve 90, thereby moving the rear valve 90 forward to open the rear valve 90, thereby releasing compressed air to the bolt 38. The bolt 38 is thereby pushed to its rearward position as the pressure from the compressed air overcomes the bias of the spring 166. At the same time, the operating rod 118 is pulled from its forward position of Figures 9 and 14 to its rearward position of Figures 10 and 13. The pawl carrier 124 is thereby moved from its left most position to its right most position. As the pawl carrier 124 moves, the surface 134 of the pawl 126 engages the wall of a cylinder 112, thereby pushing the cylinder 110 so that the next chamber 112 is aligned with the barrel 14. The bearing 116 is briefly biased out of the flute 114, engaging the next flute 114 once the appropriate 112 chamber is aligned with the barrel 14. The above portion of the firing sequence, although based on semi-automatic fire, is identical for full automatic fire. The subsequent portion of the firing sequence changes depending on whether semi-automatic or full automatic fire is selected, and the rate of full automatic fire selected.